Accidental death of adult Red-footed Falcons *Falco vespertinus* and its effect on breeding success

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Purger, J. J. 1997: Accidental death of adult Red-footed Falcons *Falco vespertinus* and its effect on breeding success. Vogelwelt 117: 325 – 327.

A colony of 27 pairs of Red-footed Falcons breeding in old nests of Rook *Corvus frugilegus* was studied during 1991 near the village Melenci (Voivodina, northern Serbia). The colony was located in a *Robinia* forest near a busy traffic highway. During the nesting period four adult ♂ and two ♀ were found dead after collisions with motor vehicles. Probably as a consequence of the death of adults, five broods failed or were deserted by the remaining parent. Twenty-two (of 27) pairs bred successfully (81.5 %) and fledged a total of 50 young (2.27 per nest). The particular location of the colony and the relatively poor feeding conditions in 1991 may have been factors explaining the high adult mortality. However, since the study colony comprised 28 % of the Red-footed Falcon breeding population of the province, the overall impact of this kind of mortality must have been substantial.

Keywords: *Falco vespertinus*, accidental death, breeding success, Voivodina, Serbia.

Introduction

Rates and causes of mortality are poorly known in raptors. This is partly due to the fact that actual deaths are seldom witnessed, so causes of mortality are often speculative, and also because no known method of study gives unbiased information on the age at death (NEWTON 1979). Ringing recoveries indicate that Red-footed Falcons can live up to 5 years or more (KEVE & SZIJJ 1957) and that some birds fall victim to other raptors (BAGYURA & HARASZTHY 1994). There is no systematic study of mortality and its demographic context in this species. The aim of this paper was to perform a census of one colony in Serbia, to determine the number causes of deaths of adult falcons and to estimate how mortality of adults affects the breeding success.

Study area and Methods

The colony was located near the village Melenci in the province Voivodina, northern Serbia (LUKAČ & LUKAČ 1990). Red-footed Falcons were nesting in abandoned nests of Rook *Corvus frugilegus*, about 5 km north-east of the village (PURGER 1996a). The colony was in a forest of *Robinia pseudacacia* 15-25 m wide, located along a 3 km stretch of the Danube-Tisa-Danube canal. It was bordered on one side by a major highway which connects the cities Zrenjanin and Kikinda. On the other side of the highway there was a line of trees. The surroundings on either side were made up of fields of sunflower, maize, clover and wheat.

To census the breeding pairs in the colony and mortality of adults in the breeding period, the colony was observed daily from 22 June until 2 August 1991, i. e. from hatching to fledging, between 16.30 h and 18.30 h. Usually we came from Melenci driving slowly parallel to the forest belt, carefully watching the road. When going back, we drove on the village road, on the other side of the forest and stopped at intervals where density of nests was high. The number of adults was surveyed daily and the number of fledglings per nest was noted. The whole area was carefully examined with the help of two colleagues with the aim to find dead birds.

Results

At the beginning of May in many nests there still were young Rooks, and the number of adult Red-footed Falcons varied. At the end of May and in June almost all Rooks were gone and Red-footed Falcons which already stayed in the colony began laying eggs. When we approached occupied nests with incubating adults, the other parent birds usually appeared and started to circle above the nests. In this way the number of occupied nests was easy to determine. In 1991, 27 pairs of Red-footed Falcons nested in the colony (PURGER 1996a). Sometimes we counted more birds, especially when they were catching insects above crop fields (with a domination of ♂). These additional birds were coming from nesting sites several kilometres away in the surroundings of the villages Bašaid and Torda (PURGER 1996a). In July parental birds did no longer stay continuously close to the nests, because the young were almost fully grown and about to fledge. From the end of July adults and fledged young usually circled in flocks above the forest or caught insects over the fields. By carefully examining the area we found six dead

adults all of which died in collisions with vehicles on the road (Table 1). Twenty nests were checked regularly by climbing the nest trees. Eighteen of these were successful and fledged a total of 41 nestlings. The other two nests failed because in each case one adult died. Not far from one of these nests, containing three eggs, we witnessed a fatal accident of one ♀ on 24 June (Table 1). On 28 June the nest was empty. After the accident, neither a ♂ nor a ♀ had been seen near the nest indicating that it belonged to the killed ♀. In another nest two nestlings were found dead on 14 July, although a ♀ was observed regularly before and for several days after the death of the nestlings. She was probably the partner of a ♂, which we found run over on the road on 11 July (Table 1).

The remaining seven nests of our colony were situated on trees we were unable to climb. They were checked from the ground by telescope. Nine young fledged from four of these nests. They could be seen standing on the edge of the nests just prior to fledging. Breeding success could not be confirmed for the remaining three nests, although we observed the adults bringing food and feeding the nestlings. The failure of one of these broods was probably due to the death of a ♂ on 7 July (Table 1), which was found run over only 15-20 m away. The other two nests were on lateral branches bent over a village road. After the deaths of two ♂ on 22 July, no more adults were seen in the vicinity of these nests. On the same day, a ♀ was also found dead (Table 1), but it could not be determined which nest she was associated with.

Discussion

In the colony of Red-footed Falcons between villages Melenci and Bašaid, immediately adjacent to a busy highway, daily surveys considerably increased the chance of finding the dead birds. Frequent patrol of the road is necessary, because a dead bird can be carried away by foxes or other raptors, or, after a few days, may be completely destroyed by being run over repeatedly. I found collisions with motor vehicles to be the cause of significant mortality of breeding adult falcons. The particular location of this colony was certainly the reason for frequent collisions of the birds with motor vehicles.

Table 1: Cases of adult Red-footed Falcons of the colony near village Melenci found injured or dead during the breeding period in 1991. – *Beobachtungen von Verlusten adulter Rotfußfalken bei der Kolonie nahe Melenci, Serbien, zur Brutzeit 1991.*

Date	Causes of death
24 June	1 ♀ was observed on low flight when colliding with a car. The driver took the bird off the radiator and threw it aside.
7 July	1 ♂ was found run over on the highway.
11 July	1 ♂ was found run over on the highway.
22 July	2 crippled ♂ were found on a stubble field along the village road. One was dead, the other heavily injured.
	1 ♀ was found along the highway, its injuries indicated that it had been run over.

The failure of five broods was probably a consequence of the adults' death. A ♂, whose ♀ died on 24 June, left the nest with eggs. The others, four ♂ and one ♀, died when their young were almost fully grown. At this time the demand for food by the nestlings and thus the activity of the adults is at its maximum. This may increase the probability of collisions with car traffic. Males contribute more than ♀ in feeding the nestlings (HORVÁTH 1955, 1964). Thus it may not have been a coincidence that there were more ♂ than ♀ among the birds killed on the road. ♂ are capable to secure the necessary amount of food for nestlings alone, but for ♀ this has not been confirmed (HORVÁTH 1964). Red-footed Falcons of either sex whose partners had died, in all likelihood, deserted their nests.

In 1991 the beginning of breeding was delayed by two weeks because of rainy, cool spring weather, and the number of breeding pairs as well as the number of nestlings per nest was lower than usual (PURGER 1995, 1996a). In the colony near Melenci in 1990 the average number of pin feathered nestlings per nest was 2.71, and in 1991 only 2.27 (PURGER 1995). Under the unfavourable conditions of that year a single adult was probably unable to obtain the necessary amount of food for nestlings, thus resulting in the failure of broods where one partner was killed.

Reproduction of Red-footed Falcons coincides with maturation of corn (FATÉR 1986; PURGER 1996b). The birds' diet is dominated by Orthoptera (CRAMP & SIMMONS 1980), which they usually catch over corn fields. The fact that birds from distant colonies came to hunt over the corn fields supports the hypothesis that food resources in 1991 were very poor. Often falcons catching insects rushed off just in front of the harvesting machines (see also FATÉR 1986; PURGER 1996b). A case has even been observed where a Red-footed Falcon defending its nest was crippled and died as a consequence of aggressive behaviour toward a corn harvester (PURGER 1996b).

The colony studied in 1991 comprised 27.7 % of the Red-footed Falcon breeding population in the Province of Voivodina (PURGER 1996a). Therefore, the accidental deaths and consequent brood losses described here probably have a significant influence on the breeding population. Probably the number of collisions could be reduced by introducing a speed limit on the highway near the forest belt containing the colony.

Acknowledgements: I would like to thank Tomislav KARANOVIĆ and Sándor LUKÁCS for their assistance in the field. This project was in part supported by the Institute of Biology in Novi Sad (Yugoslavia).

Zusammenfassung

Purger, J. J. 1997: Kollisionen mit Fahrzeugen als Todesursache beim Rotfußfalken *Falco vespertinus* und ihr Einfluß auf den Bruterfolg. Vogelwelt 118: 325 – 327.

Eine Rotfußfalken-Kolonie mit 27 Brutpaaren nahe der Ortschaft Melenci (Voivodina, Nord-Serbien) wurde zur Brutzeit 1991 täglich kontrolliert. Die Kolonie befand sich in alten Saatkrähennestern in einem Robinienwald direkt neben einer stark befahrenen Hauptverkehrsstraße. Vom 22. Juni bis 2. August 1991 wurden vier adulte ♂ und zwei ad. ♀ durch Kollisionen mit Fahrzeugen auf dieser Straße getötet. Fünf Bruten wurden im Zusammenhang mit diesen Unfällen von den allein zurückgebliebenen Partnern während der Nestlingsphase aufgegeben. Offenbar waren diese Altvögel in der relativ ungünstigen Brutsaison 1991 (kühles Frühjahr, geringes Nahrungsangebot) nicht in der Lage, die Brut allein aufzuziehen. Die anderen 22 Paare (81,5 %) brüteten erfolgreich und brachten 50 Jungvögel (2,27 pro erfolgreicher Brut) zum Ausfliegen. Damit war die Reproduktionsrate geringer als im Jahr zuvor (2,71 pro erfolgreicher Brut). Als Ursache für die ungewöhnlich hohen Altvogelverluste kommt neben der Lage der Kolonie direkt an einer Fernstraße auch die ungünstige Witterung in Frage, die die Altvögel während der Phase des maximalen Nahrungsbedarfs der Nestlinge zu längeren Beuteflügen (mit häufigerer Straßenquerung) zwang. Da die untersuchte Kolonie 28 % der Rotfußfalken-Brutpopulation der Provinz Voivodina ausmachte, dürften die beschriebenen Verluste erheblichen Einfluß auch auf Populationsebene haben.

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Manuskripteingang: 27. März 1997
Annahme: 17. Juni 1997